Global Innovation Index 2022

MONTENEGRO

60th Montenegro ranks 60th among the 132 economies featured in the GII 2022.

The Global Innovation Index (GII) ranks world economies according to their innovation capabilities. Consisting of roughly 80 indicators, grouped into innovation inputs and outputs, the GII aims to capture the multi-dimensional facets of innovation.

The following table shows the rankings of Montenegro over the past three years, noting that data availability and changes to the GII model framework influence year-on-year comparisons of the GII rankings. The statistical confidence interval for the ranking of Montenegro in the GII 2022 is between ranks 58 and 63.

Rankings for Montenegro (2020–2022)

GIIYR	GII	Innovation inputs	Innovation outputs
2020	49	53	49
2021	50	53	53
2022	60	51	72

- Montenegro performs better in innovation inputs than innovation outputs in 2022.
- This year Montenegro ranks 51st in innovation inputs, higher than both 2021 and 2020.
- As for innovation outputs, Montenegro ranks 72nd. This position is lower than both 2021 and 2020.

13th Montenegro ranks 13th among the 36 upper-middle-income group economies.

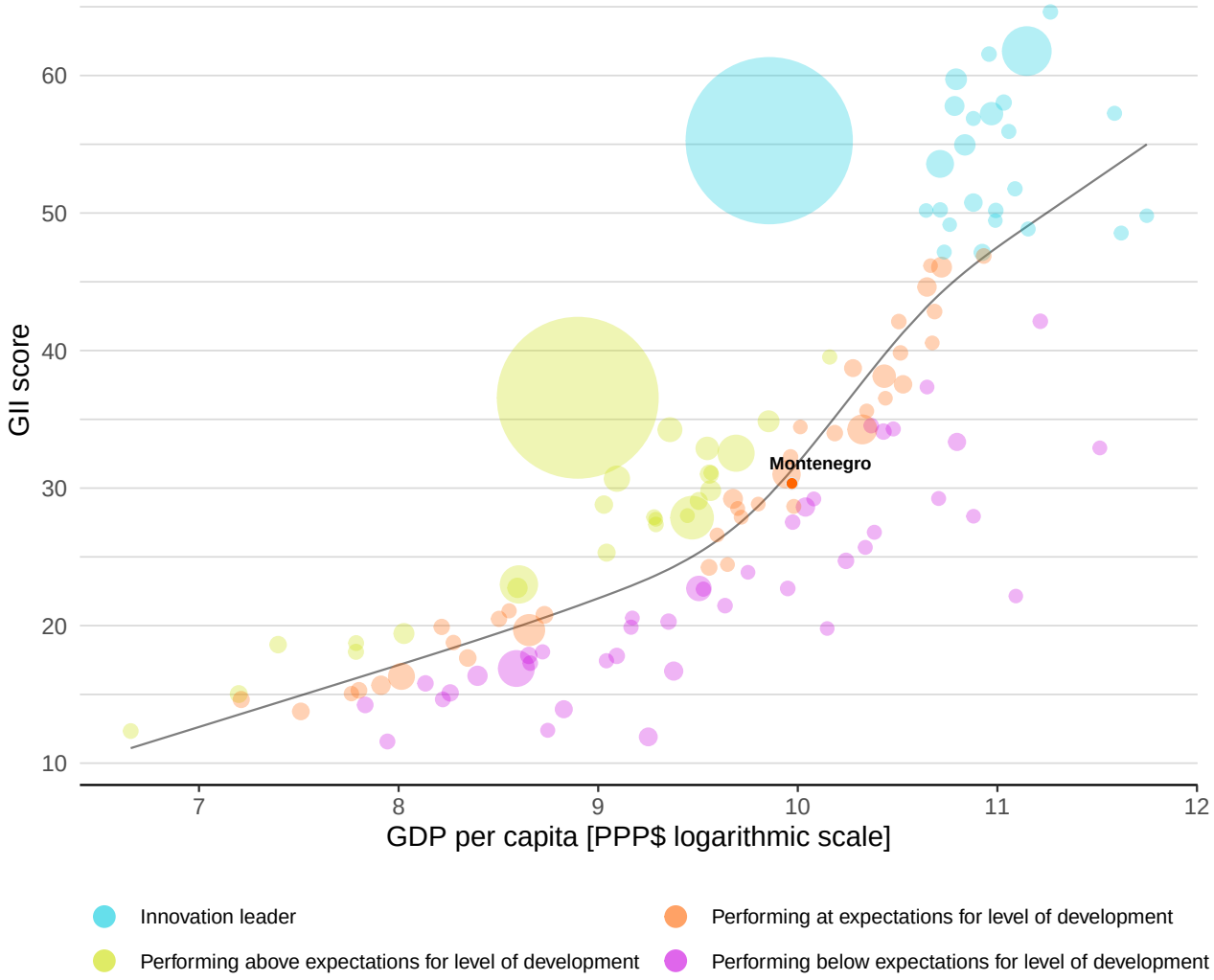
35th Montenegro ranks 35th among the 39 economies in Europe.

EXPECTED VS. OBSERVED INNOVATION PERFORMANCE

The bubble chart below shows the relationship between income levels (GDP per capita) and innovation performance (GII score). The trend line gives an indication of the expected innovation performance according to income level. Economies appearing above the trend line are performing better than expected and those below are performing below expectations.

Relative to GDP, Montenegro's performance is at expectations for its level of development.

The positive relationship between innovation and development

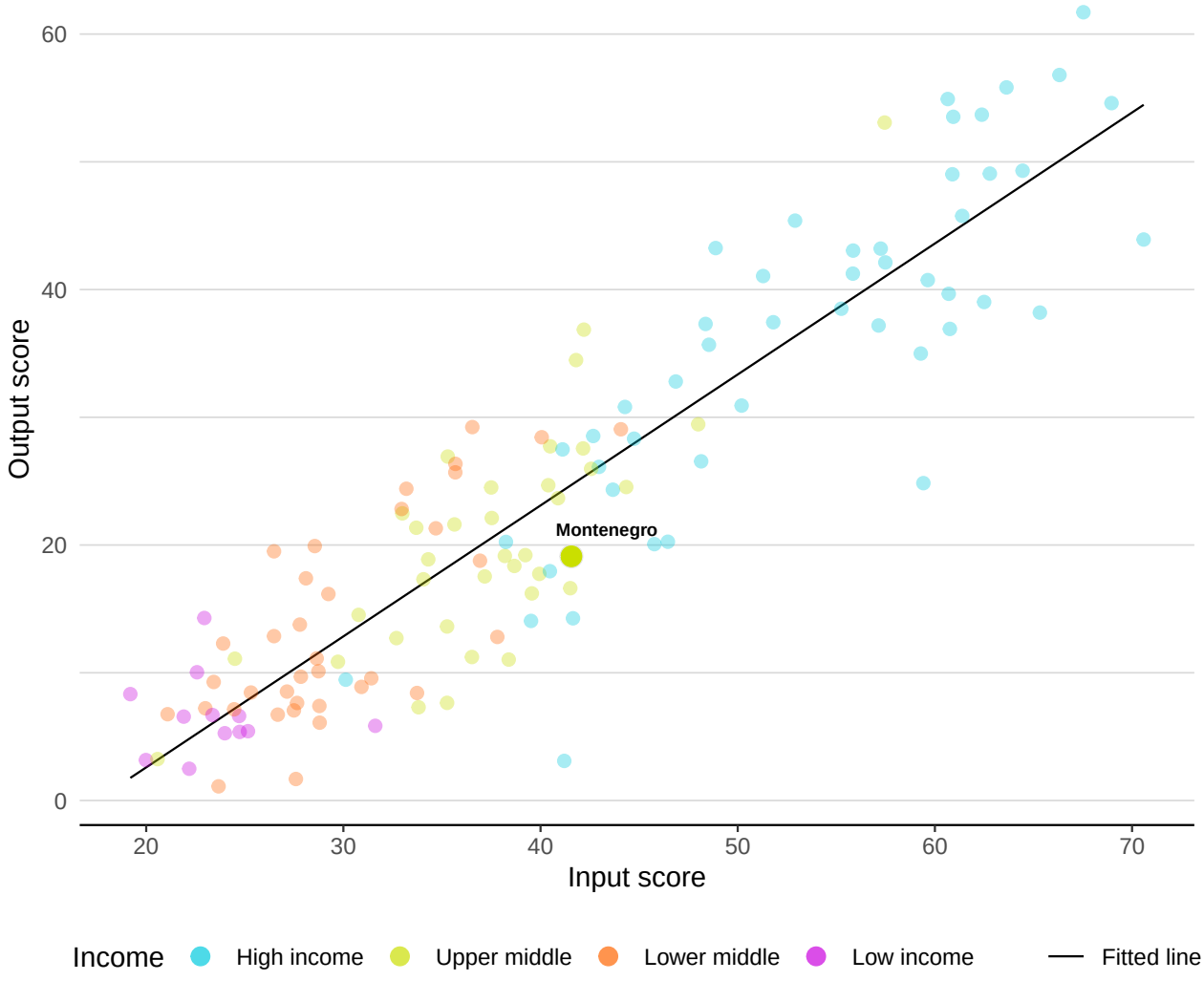


EFFECTIVELY TRANSLATING INNOVATION INVESTMENTS INTO INNOVATION OUTPUTS

The chart below shows the relationship between innovation inputs and innovation outputs. Economies above the line are effectively translating costly innovation investments into more and higher-quality outputs.

Montenegro produces less innovation outputs relative to its level of innovation investments.

Innovation input to output performance



BENCHMARKING AGAINST OTHER UPPER MIDDLE-INCOME GROUP ECONOMIES AND EUROPE

The seven GII pillar scores for Montenegro

Upper-middle-income group economies

Montenegro performs above the upper-middle-income group average in five pillars, namely: Institutions; Human capital and research; Infrastructure; Market sophistication; and, Business sophistication.

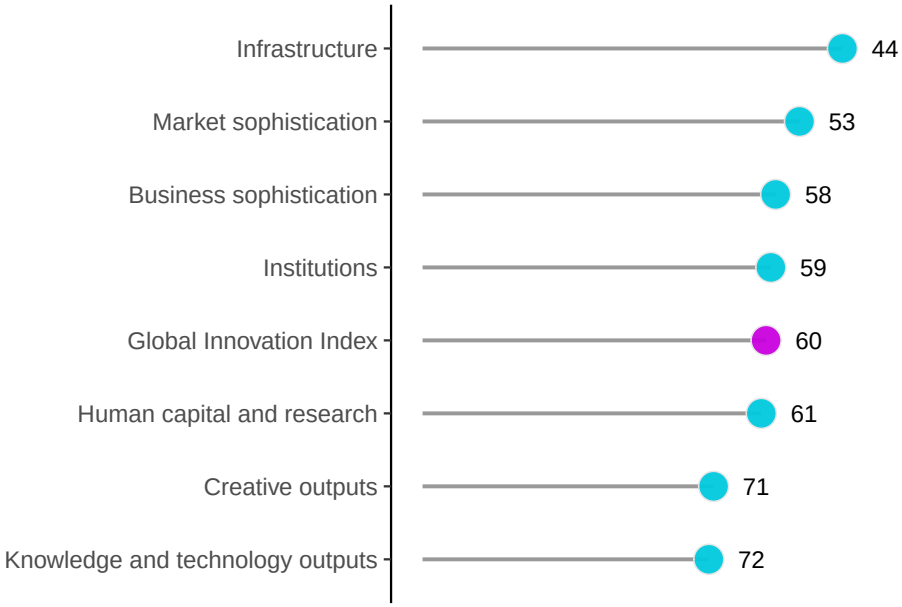
Europe

Montenegro performs below the regional average in all GII pillars.

OVERVIEW OF RANKINGS IN THE SEVEN GII 2022 AREAS

Montenegro performs best in Infrastructure and its weakest performance is in Knowledge and technology outputs.

The seven GII pillar ranks for Montenegro



Note: The highest possible ranking in each pillar is 1.

The full WIPO Intellectual Property Statistics profile for Montenegro can be found at:

https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=ME.

INNOVATION STRENGTHS AND WEAKNESSES

The table below gives an overview of the indicator strengths and weaknesses of Montenegro in the GII 2022.

Strengths and weaknesses for Montenegro

Strengths			Weaknesses		
Code	**Indicator name**	**Rank**	**Code**	**Indicator name**	**Rank**
3.1.1	ICT access	25	2.3.3	Global corporate R&D investors, top 3, mn USD	38
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	4	2.3.4	QS university ranking, top 3	72
5.3.3	ICT services imports, % total trade	17	4.3.3	Domestic market scale, bn PPP$	131
5.3.4	FDI net inflows, % GDP	10	5.1.2	Firms offering formal training, %	91
6.1.4	Scientific and technical articles/bn PPP$ GDP	28	5.2.2	State of cluster development and depth	97
6.2.2	New businesses/th pop. 15–64	18	5.2.5	Patent families/bn PPP$ GDP	101
6.2.3	Software spending, % GDP	22	6.1.5	Citable documents H-index	124
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	15	6.2.5	High-tech manufacturing, %	88
7.2.4	Printing and other media, % manufacturing	4	7.1.1	Intangible asset intensity, top 15, %	78
7.3.2	Country-code TLDs/th pop. 15–69	1	7.1.4	Industrial designs by origin/bn PPP$ GDP	114

GII 2022 rank

Montenegro

60

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
72	51	Upper middle	EUR	0.6	13.3	21,387

		Score/ Value	Rank	
Institutions		**58.3**	**59**	
1.1	**Political environment**	60.1	63	
1.1.1	Political and operational stability*	70.9	53	
1.1.2	Government effectiveness*	49.4	71	
1.2	**Regulatory environment**	72.4	41	
1.2.1	Regulatory quality*	54.8	54	
1.2.2	Rule of law*	47.6	59	
1.2.3	Cost of redundancy dismissal	11.2	36	
1.3	**Business environment**	42.4	[80]	
1.3.1	Policies for doing business†	42.4	87	
1.3.2	Entrepreneurship policies and culture*	n/a	n/a	
Human capital and research		**32.2**	**61**	
2.1	**Education**	57.7	[48]	
2.1.1	Expenditure on education, % GDP	n/a	n/a	
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	n/a	
2.1.3	School life expectancy, years	15.1	51	
2.1.4	PISA scales in reading, maths and science	421.9	55	
2.1.5	Pupil-teacher ratio, secondary	14.4	67	
2.2	**Tertiary education**	36.3	44	
2.2.1	Tertiary enrolment, % gross	55.5	57	
2.2.2	Graduates in science and engineering, %	20.5	64	
2.2.3	Tertiary inbound mobility, %	n/a	n/a	
2.3	**Research and development (R&D)**	2.5	82	
2.3.1	Researchers, FTE/mn pop.	746.8	61	
2.3.2	Gross expenditure on R&D, % GDP	0.4	72	
2.3.3	Global corporate R&D investors, top 3, mn USD	0.0	38 ○ ◇	
2.3.4	QS university ranking, top 3*	0.0	72 ○ ◇	
Infrastructure		**51.1**	**44**	◆
3.1	**Information and communication technologies (ICTs)**	68.5	79	
3.1.1	ICT access*	92.9	25 ● ◆	
3.1.2	ICT use*	72.1	52 ◆	
3.1.3	Government's online service*	54.1	96	
3.1.4	E-participation*	54.8	93	
3.2	**General infrastructure**	34.1	49	
3.2.1	Electricity output, GWh/mn pop.	5,532.3	36 ◆	
3.2.2	Logistics performance*	32.6	75	
3.2.3	Gross capital formation, % GDP	29.3	27 ◆	
3.3	**Ecological sustainability**	50.7	9 ● ◆	
3.3.1	GDP/unit of energy use	10.9	60	
3.3.2	Environmental performance*	46.9	49	
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	12.3	4 ● ◆	
Market sophistication		**36.7**	**53**	
4.1	**Credit**	22.3	79	
4.1.1	Finance for startups and scaleups*	n/a	n/a	
4.1.2	Domestic credit to private sector, % GDP	60.0	57	
4.1.3	Loans from microfinance institutions, % GDP	1.6	19	
4.2	**Investment**	31.8	[24]	
4.2.1	Market capitalization, % GDP	84.9	21	
4.2.2	Venture capital investors, deals/bn PPP$ GDP	n/a	n/a	
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	n/a	n/a	
4.2.4	Venture capital received, value, % GDP	n/a	n/a	
4.3	**Trade, diversification, and market scale**	56.0	69	
4.3.1	Applied tariff rate, weighted avg., %	2.6	68	
4.3.2	Domestic industry diversification	84.8	62	
4.3.3	Domestic market scale, bn PPP$	13.3	131 ○	

		Score/ Value	Rank	
Business sophistication		**29.5**	**58**	
5.1	**Knowledge workers**	36.1	56	
5.1.1	Knowledge-intensive employment, %	36.7	40	◆
5.1.2	Firms offering formal training, %	15.8	91 ○ ◇	
5.1.3	GERD performed by business, % GDP	0.2	54	
5.1.4	GERD financed by business, %	37.8	48	
5.1.5	Females employed w/advanced degrees, %	18.2	39	◆
5.2	**Innovation linkages**	20.7	87	
5.2.1	University-industry R&D collaboration†	42.8	71	
5.2.2	State of cluster development and depth†	41.7	97 ○	
5.2.3	GERD financed by abroad, % GDP	0.0	53	
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	0.0	42	
5.2.5	Patent families/bn PPP$ GDP	0.0	101 ○ ◇	
5.3	**Knowledge absorption**	31.9	57	
5.3.1	Intellectual property payments, % total trade	0.2	92	
5.3.2	High-tech imports, % total trade	8.7	59	
5.3.3	ICT services imports, % total trade	2.9	17 ● ◆	
5.3.4	FDI net inflows, % GDP	9.1	10 ● ◆	
5.3.5	Research talent, % in businesses	12.6	59	
Knowledge and technology outputs		**19.4**	**72**	
6.1	**Knowledge creation**	13.9	59	
6.1.1	Patents by origin/bn PPP$ GDP	0.4	79	
6.1.2	PCT patents by origin/bn PPP$ GDP	0.2	48	
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a	
6.1.4	Scientific and technical articles/bn PPP$ GDP	32.8	28 ● ◆	
6.1.5	Citable documents H-index	1.8	124 ○	
6.2	**Knowledge impact**	32.5	50	
6.2.1	Labor productivity growth, %	n/a	n/a	
6.2.2	New businesses/th pop. 15–64	7.9	18 ● ◆	
6.2.3	Software spending, % GDP	0.4	22 ● ◆	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	18.3	15 ● ◆	
6.2.5	High-tech manufacturing, %	10.3	88 ○	
6.3	**Knowledge diffusion**	11.7	97	
6.3.1	Intellectual property receipts, % total trade	0.0	83	
6.3.2	Production and export complexity	n/a	n/a	
6.3.3	High-tech exports, % total trade	0.5	92	
6.3.4	ICT services exports, % total trade	3.4	35	
Creative outputs		**18.8**	**71**	
7.1	**Intangible assets**	7.0	109 ○ ◇	
7.1.1	Intangible asset intensity, top 15, %	−295.8	78 ○ ◇	
7.1.2	Trademarks by origin/bn PPP$ GDP	29.5	77	
7.1.3	Global brand value, top 5,000, % GDP	n/a	n/a	
7.1.4	Industrial designs by origin/bn PPP$ GDP	0.1	114 ○	
7.2	**Creative goods and services**	34.6	[19]	
7.2.1	Cultural and creative services exports, % total trade	0.9	33	
7.2.2	National feature films/mn pop. 15–69	n/a	n/a	
7.2.3	Entertainment and media market/th pop. 15–69	n/a	n/a	
7.2.4	Printing and other media, % manufacturing	3.0	4 ● ◆	
7.2.5	Creative goods exports, % total trade	0.3	69	
7.3	**Online creativity**	26.8	27 ● ◆	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	1.7	83	
7.3.2	Country-code TLDs/th pop. 15–69	100.0	1 ● ◆	
7.3.3	GitHub commit pushes received/mn pop. 15–69	5.4	55	
7.3.4	Mobile app creation/bn PPP$ GDP	0.3	87	

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at https://www.wipo.int/global_innovation_index/en/2022. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

DATA AVAILABILITY

The following tables list indicators that are either missing or outdated for Montenegro.

Missing data for Montenegro

Code	Indicator name	Economy year	Model year	Source
1.3.2	Entrepreneurship policies and culture	n/a	2021	Global Entrepreneurship Monitor
2.1.1	Expenditure on education, % GDP	n/a	2020	UNESCO Institute for Statistics
2.1.2	Government funding/pupil, secondary, % GDP/cap	n/a	2018	UNESCO Institute for Statistics
2.2.3	Tertiary inbound mobility, %	n/a	2019	UNESCO Institute for Statistics
4.1.1	Finance for startups and scaleups	n/a	2021	Global Entrepreneurship Monitor
4.2.2	Venture capital investors, deals/bn PPP$ GDP	n/a	2021	Refinitiv
4.2.3	Venture capital recipients, deals/bn PPP$ GDP	n/a	2021	Refinitiv
4.2.4	Venture capital received, value, % GDP	n/a	2021	Refinitiv
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	2020	World Intellectual Property Organization
6.2.1	Labor productivity growth, %	n/a	2021	The Conference Board
6.3.2	Production and export complexity	n/a	2019	Harvard University, Growth Lab
7.1.3	Global brand value, top 5,000, % GDP	n/a	2021	Brand Finance
7.2.2	National feature films/mn pop. 15–69	n/a	2019	OMDIA
7.2.3	Entertainment and media market/th pop. 15–69	n/a	2021	PwC, GEMO

Outdated data for Montenegro

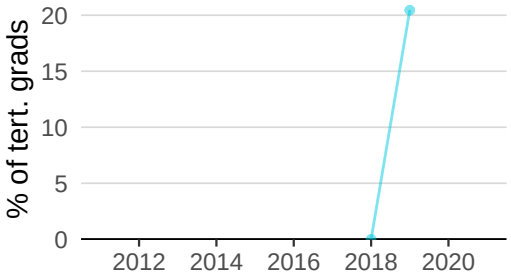
Code	Indicator name	Economy year	Model year	Source
2.2.2	Graduates in science and engineering, %	2019	2020	UNESCO Institute for Statistics
2.3.1	Researchers, FTE/mn pop.	2019	2020	UNESCO Institute for Statistics
2.3.2	Gross expenditure on R&D, % GDP	2019	2020	UNESCO Institute for Statistics
3.2.1	Electricity output, GWh/mn pop.	2019	2020	International Energy Agency
4.2.1	Market capitalization, % GDP	2012	2020	World Federation of Exchanges
4.3.2	Domestic industry diversification	2017	2019	United Nations Industrial Development Organization
5.1.1	Knowledge-intensive employment, %	2020	2021	International Labour Organization
5.1.3	GERD performed by business, % GDP	2018	2020	UNESCO Institute for Statistics
5.1.4	GERD financed by business, %	2018	2019	UNESCO Institute for Statistics

Code	Indicator name	Economy year	Model year	Source
5.1.5	Females employed w/advanced degrees, %	2020	2021	International Labour Organization
5.2.3	GERD financed by abroad, % GDP	2018	2019	UNESCO Institute for Statistics
5.2.4	Joint venture/strategic alliance deals/bn PPP$ GDP	2020	2021	Refinitiv
5.3.5	Research talent, % in businesses	2019	2020	UNESCO Institute for Statistics
6.2.5	High-tech manufacturing, %	2017	2019	United Nations Industrial Development Organization
7.2.4	Printing and other media, % manufacturing	2015	2019	United Nations Industrial Development Organization
7.2.5	Creative goods exports, % total trade	2019	2020	United Nations Comtrade Database

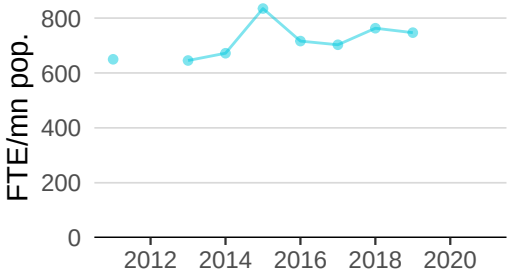
MONTENEGRO'S INNOVATION SYSTEM

As far as practicable, the plots below present unscaled indicator data.

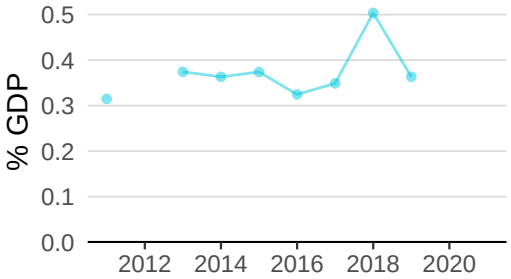
Innovation inputs



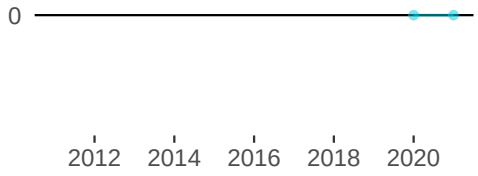
2.2.2 Graduates in science and engineering was equal to 20.5% of tert. grads in 2019–up by Inf percentage points from the year prior–and equivalent to an indicator rank of 64.



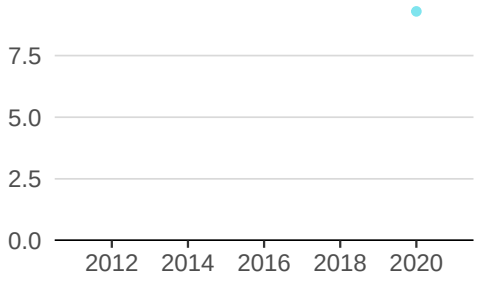
2.3.1 Researchers was equal to 746.8 FTE/mn pop. in 2019–down by 2 percentage points from the year prior–and equivalent to an indicator rank of 61.



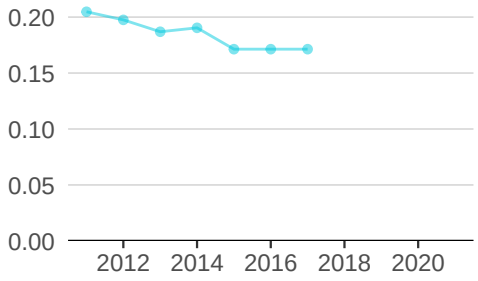
2.3.2 Gross expenditure on R&D was equal to 0.4% GDP in 2019–down by 28 percentage points from the year prior–and equivalent to an indicator rank of 72.



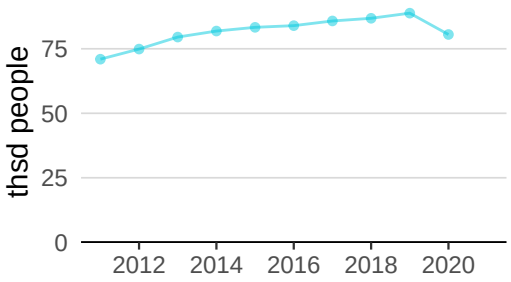
2.3.4 QS university ranking was equal to 0.0 in 2021–effectively unchanged from the year prior–and equivalent to an indicator rank of 72.



3.1.1 ICT access was equal to 9.3 in 2020 and equivalent to an indicator rank of 25.

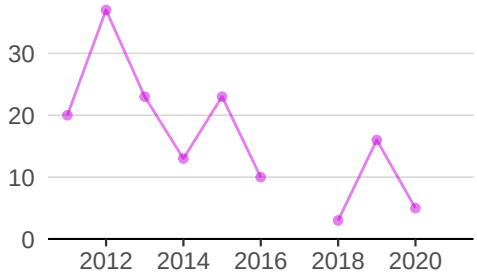


4.3.2 Domestic industry diversification was equal to 0.2 in 2017–effectively unchanged from the year prior–and equivalent to an indicator rank of 62.

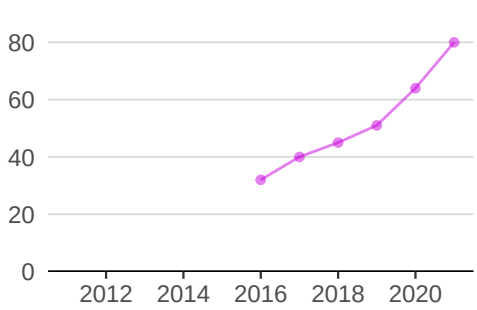


5.1.1 Knowledge-intensive employment was equal to 80.5 thsd people in 2020–down by 9 percentage points from the year prior–and equivalent to an indicator rank of 40.

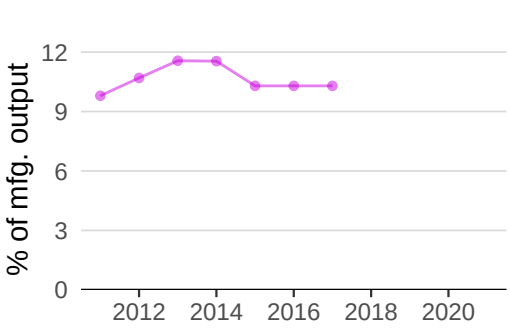
Innovation outputs



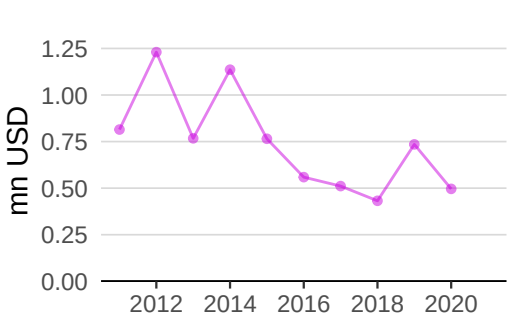
6.1.1 Patents by origin was equal to 5.0 in 2020–down by 69 percentage points from the year prior–and equivalent to an indicator rank of 79.



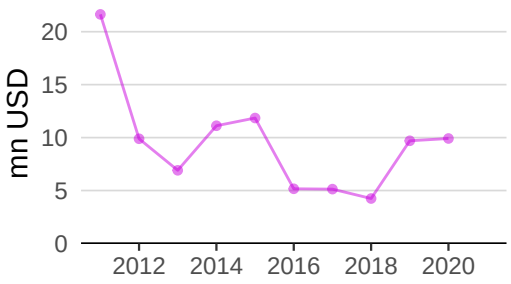
6.1.5 Citable documents H-index was equal to 80.0 in 2021–up by 25 percentage points from the year prior–and equivalent to an indicator rank of 124.



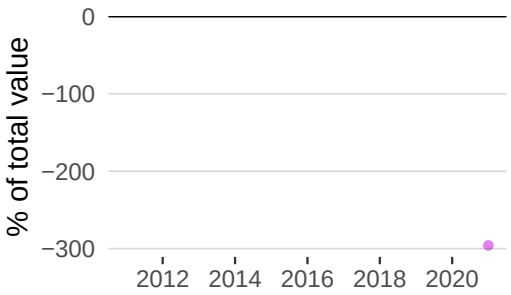
6.2.5 High-tech manufacturing was equal to 10.3% of mfg. output in 2017–effectively unchanged from the year prior–and equivalent to an indicator rank of 88.



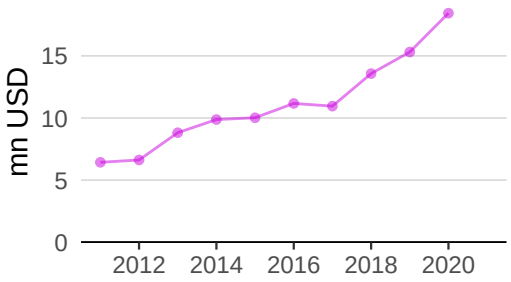
6.3.1 Intellectual property receipts was equal to 0.5 mn USD in 2020–down by 33 percentage points from the year prior–and equivalent to an indicator rank of 83.



6.3.3 High-tech exports was equal to 9.9 mn USD in 2020–up by 2 percentage points from the year prior–and equivalent to an indicator rank of 92.



7.1.1 Intangible asset intensity was equal to -295.8% of total value in 2021 and equivalent to an indicator rank of 78.



7.2.1 Cultural and creative services exports was equal to 18.4 mn USD in 2020–up by 20 percentage points from the year prior–and equivalent to an indicator rank of 33.

MONTENEGRO'S INNOVATION TOP PERFORMERS

2.3.3 Global corporate R&D investors

Firm	Industry	R&D	R&D Growth	R&D Intensity	Rank

No observations

Source: European Commission's Joint Research Centre (https://iri.jrc.ec.europa.eu/scoreboard/2021-eu-industrial-rd-investment-scoreboard).

2.3.4 QS university ranking

University	Score	Rank

No observations

Source: QS Quacquarelli Symonds Ltd (https://www.topuniversities.com/university-rankings/world-university-rankings/2022).

7.1.1 Intangible asset intensity, top 15

Firm	Rank
CRNOGORSKA KOMERCIJALNA BANK	1
ADDIKO BANK	2
KOD CLOUD	3

Source: Brand Finance (https://brandirectory.com/reports/gift-2021).
Note: Brand Finance only provides within economy ranks.

7.1.3 Global brand value, top 5,000

Brand	Industry	Rank

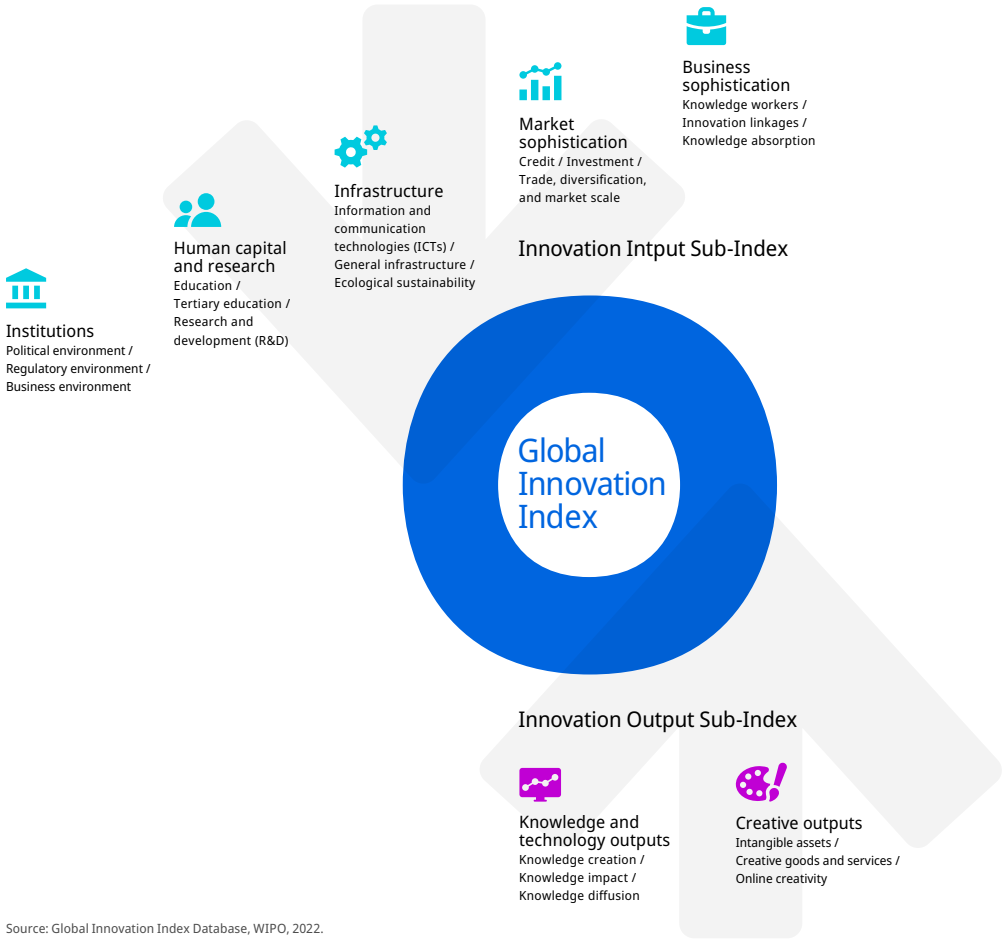
No observations

Source: Brand Finance (https://brandirectory.com).

ABOUT THE GLOBAL INNOVATION INDEX

The Global Innovation Index (GII) is published by the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations.

Recognizing that innovation is a key driver of economic development, the GII aims to provide an innovation ranking and rich analysis referencing around 130 economies. Over the last decade, the GII has established itself as both a leading reference on innovation and a “tool for action” for economies that incorporate the GII into their innovation agendas.



Source: Global Innovation Index Database, WIPO, 2022.

The Index is a ranking of the innovation capabilities and results of world economies. It measures innovation based on criteria that include institutions, human capital and research, infrastructure, credit, investment, linkages; the creation, absorption and diffusion of knowledge; and creative outputs.

The GII has two sub-indices: the Innovation Input Sub-Index and the Innovation Output Sub-Index, and seven pillars, each consisting of three sub-pillars.